

# PATENT SPECIFICATION



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399,132

Complete Accepted: Sept. 28, 1933.

## COMPLETE SPECIFICATION.

### Improvements in and relating to the Manufacture of Metal Drums, Tanks and like Vessels.

We, THOMAS DUNLOP CARPENTER, a British Subject, of Ranfield, 5, Wykeham Road, Scotstownhill, Glasgow, W.3, and METAL CONTAINERS LIMITED, a Company organised under British Law, of Transport House, Smith Square, Westminster, London, S.W.1, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has reference to sheet metal drums, tanks and like vessels of the kind having secured to their walls at convenient points metal bosses adapted to permit of filling, emptying or the connection thereto of tubular or other fittings.

In the manufacture of such sheet metal drums and like vessels considerable difficulty is experienced when securing in place the bosses by gas welding owing partly to the readiness with which the sheet metal may be burned and damaged if the flame be allowed to impinge on it at any one place for too prolonged a period, and partly to the distortion which occurs in the sheet consequent upon the heating effect of the welding flame, and when the metal being worked is stainless steel this burning and distortion difficulty is particularly acute.

It is with the object of overcoming these difficulties and of providing a stronger and neater joint that the improved method of connection of these parts forming the subject matter of the present invention has been devised, such method being especially valuable when manufacturing casks, drums and like vessels of stainless steel.

According to this invention the metal sheet to which the boss is to be secured is corrugated annularly about the opening intended to receive the boss while the edge of the sheet immediately adjacent the opening is flanged outwardly and is arranged to be accommodated in a recess formed externally of the boss, and connection of the parts is effected by welding both internally and externally of the sheet. The corrugating of the metal about the opening serves to absorb the major part of the distortion arising and thus

[Price 1/-]

enables the operation to be completed with greater accuracy and ease than has hitherto been possible.

The invention is hereinafter more fully described with reference to the accompanying sheet of illustrative drawings wherein:—

Fig. 1 is a diametrical section through a circular sheet adapted to form the end of a drum, the sheet being fitted centrally thereof with a boss secured in accordance with this invention.

Fig. 2 is a fragmentary plan of the same and

Fig. 3 is a radial sectional view showing on a larger scale the boss and the prepared sheet placed together in readiness for welding and

Fig. 4 is a similar view showing the parts after completion of the welding.

Referring to these figures it will be seen that the boss *a* to be secured to the sheet *b* is recessed externally at *c* in order that it may accommodate snugly an outwardly directed flange *d* formed on the sheet *b* marginally of the opening in which the boss is to be fitted. The recess *c* referred to may be of a depth slightly greater than the thickness of the sheet metal in the flange *d* so that part of the projecting shoulder of metal on the boss *a* may flow into the joint on welding and assist in making a stronger and smoother weld but the length of the recess measured axially of the boss is preferably slightly in excess of the total depth of the flange, whereby the inner end of the boss is permitted to project slightly beyond the internal surface of the sheet before the welding is effected.

Prior to making a welded connection between these parts the sheet *b* is, according to this invention corrugated annularly about the opening which is to receive the boss *a* as shown at *e* in order to render the metal surrounding the flange more yielding in character whereby the distortion arising from the heating effects of the welding to be performed is made less noticeable.

The complementary parts so prepared may then be placed together as shown in Fig. 3 and secured permanently one to

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another as shown in Fig. 4 by two welds *f* and *g* extending peripherally of the boss, the one weld *f* being applied externally where the outer end of the flange *d* abuts against the shoulder terminating the recess *c* whilst the other weld *g* is effected between the inner surface of the sheet *b* and that end of the boss *a* projecting beyond said inner surface. In making the joint at *f* additional weld metal may be applied.

Since the thickness of the metal comprised in the boss *a* may be made greater than that permissible in the sheet *b*, the boss is less susceptible to damage from the action of the welding flame and a secure and smooth welded joint *g* is obtained on the inner side of the sheet by directing the welding flame mainly upon the projecting inner end of the boss at an appropriate angle somewhat as indicated by the arrow *W* in Fig. 3. By this means the relatively thin and susceptible sheet metal *b* is protected somewhat from the full heat of the flame while the projecting portion of the boss *a* is caused to flow and unite to the sheet *b* in a manner producing a smooth and substantially flush joint. As will be understood this latter welding operation will be performed with the parts inverted whereby the inner surface of the sheet *b* will be uppermost.

We have found the method described especially valuable in the manufacture of drums, casks and like vessels of stainless steel which normally is so subject to distortion when being welded as to render the jointing of the parts referred to extremely difficult. The corrugating of the sheet about the opening together with the strengthening of the inner lip by forming the flange around the opening reduces the objectional distortion effects to such a degree as to render the jointing of these parts by welding a comparatively simple operation. Moreover, the end of the boss *a* which initially projects beyond the inner face of the sheet not only provides the metal with which the inside weld *g* is made but by absorbing the main

heat of the welding flame it serves to protect the relatively thin sheet *b* against damage. Also by this means a smooth and substantially flush inside weld *g* is secured which has distinct advantages in a cask or like vessel.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. The improved method of jointing a boss to an opening in a metal sheet forming part of a drum, tank or like vessel by welding which consists in first corrugating the sheet annularly about the opening and forming on the inner lip of the sheet immediately surrounding the opening a flange adapted to be accommodated in a recess formed peripherally of the boss.

2. The method of connecting a boss to an opening in a metal sheet forming part of a drum, tank or like vessel according to claim 1 wherein the recess externally of the boss is of greater length than the depth of the flange on the sheet, whereby the free end of the boss may before the welding is effected project slightly beyond the inner surface of the sheet substantially as and for the purpose described.

3. The method of connecting a boss to an opening in a metal sheet forming part of a drum tank or like vessel according to claim 2, wherein the free end of the boss projecting beyond the inner surface of the sheet is caused by the welding operation to flow and unite with the surrounding sheet in a substantially flush joint substantially as described.

4. The improved method of welding a metal boss to a metal sheet forming part of a drum, tank or like vessel, substantially as herein described with reference to the accompanying drawings.

Dated this 9th day of June, 1933.

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Agent for the Applicants.

Fig. 1

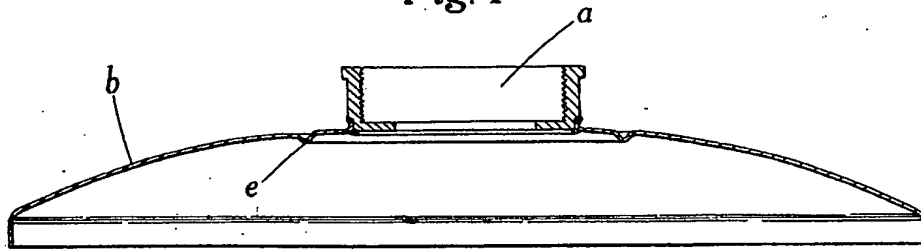


Fig. 2.

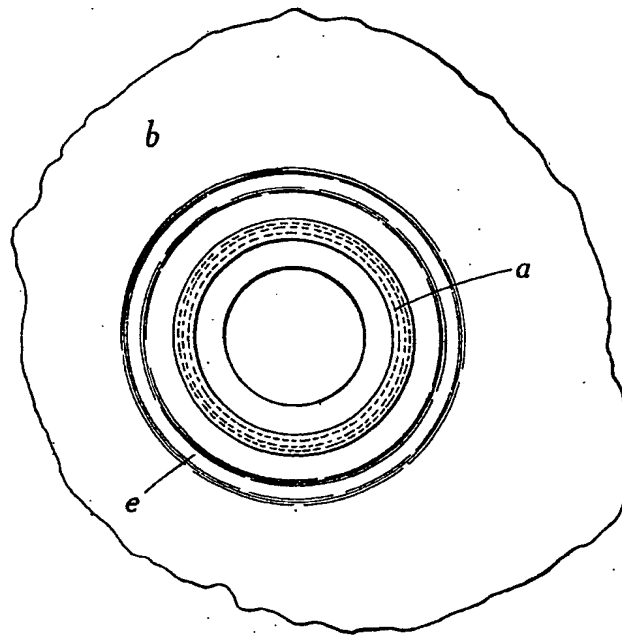


Fig. 3.

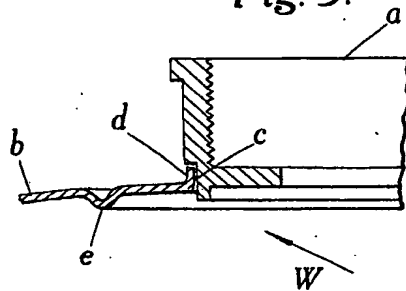
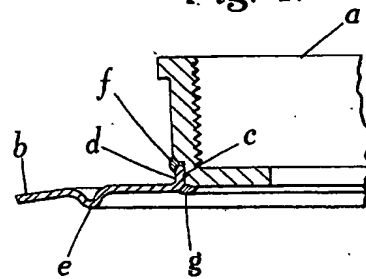


Fig. 4.



[This Drawing is a reproduction of the Original on a reduced scale.]